**Rapid Assessment of Wetlands within Confined Valleys, and USACE NMRAM Phase 2, New Mexico**
CWA Section 104(b)(3) Wetlands Development Grant
**Assistance Agreement No. CD# 01F109-01-0A (FY2015)**

# Quality Assurance Project Plan

Submitted by:
New Mexico Environment Department
Surface Water Quality Bureau

## A PROJECT MANAGEMENT

### A1 Title and Approval Sheet

Maryann McGraw Date: 2/25/2020
Maryann McGraw
Wetlands Program Coordinator, SWQB

Miguel Montoya Date: 2/25/2020
Miguel Montoya
Quality Assurance Officer, SWQB

Abraham Franklin Date: 2/21/2020
Abraham Franklin
Program Manager, SWQB Watershed Protection Section

Leslie C. Rauscher Date: 4/7/20 LR
Leslie Rauscher
Project Officer, WQPD, EPA Region 6

NELLY SMITH Digitally signed by NELLY SMITH DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=NELLY SMITH, 0.9.2342.19200300.100.1.1=68001003655673 Date: 2020.04.07 18:21:46 -05'00' Date: 4/7/20
Nelly Smith
Chief, State and Tribal Programs Section, WQPD, EPA Region 6

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## A2 Table of Contents

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## List of Abbreviations

| | |
|---|---|
| ABS | Above Sea Level |
| CD | Compact disc |
| CRAM | California Rapid Assessment Method |
| CWA | Clean Water Act |
| DOQQ | Digital Orthophoto Quarter Quadrangles |
| DOT | Department of Transportation |
| DQI | Data Quality Indicators |
| DQO | Data Quality Objectives |
| EPA | United States Environmental Protection Agency |
| FY | Fiscal Year |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| HGM | Hydrogeomorphic Method |
| HUC | Hydrologic Unit Codes |
| MA | Master of Arts |
| MQO | Measurement Quality Objectives |
| MS | Master of Sciences |
| NA | Not Applicable |
| NEPA | National Environmental Policy Act |
| NHNM | Natural Heritage New Mexico, University of New Mexico |
| NMED | New Mexico Environment Department |
| NMRAM | New Mexico Rapid Assessment Method |
| NWCA | National Wetlands Condition Assessment |
| NWI | National Wetlands Inventory |
| PO | Project Officer |
| QA | Quality Assurance |
| QC | Quality Control |
| QAPP | Quality Assurance Project Plan |
| RA | Rapid Assessment |
| RID | Request Identification Number |
| SA | Sampling Area |
| SOP | Standard Operating Procedures |
| SQUID | Surface Water Quality Information Database |
| SWQB | New Mexico Environment Department Surface Water Quality Bureau |
| US EPA | United States Environmental Protection Agency |
| WOI | Wetland of Interest |
| WPS | Watershed Protection Section |
| WPC | Wetlands Program Coordinator |

### A3 Distribution List

This EPA-approved Quality Assurance Project Plan (QAPP) signed original will be kept on file at SWQB and a copy will be kept on file at the lead contractor's office (Natural Heritage New Mexico, University of New Mexico (NHNM)).

The Wetlands Program Coordinator (WPC) will ensure all members of the distribution list who do not have signature authority to approve this QAPP will review the QAPP and sign the Acknowledgment Statement prior to initiating any work for this project. The signed Acknowledgement Statements (electronic or hard copy) will be collected by the SWQB Wetlands Program Coordinator and will be given to the QA Officer for filing with the original approved QAPP. The NHNM Director will ensure that any NHNM other staff involved in data collection or analysis for this project have access to a copy of this QAPP, review its contents, and follow its quality assurance procedures.

Table A4.1 lists the roles and responsibilities of persons that will collect and/or use the information gathered for the classification verification, wetlands assessment, and multi-metric analyses.

**Table A4.1: Distribution List with Roles and Responsibilities**

| Name | Organization | Role | Responsibilities | Contact Information |
|---|---|---|---|---|
| Abe Franklin | SWQB | Watershed Protection Section Program Manager | Review of QAPP. | (505) 827-2793<br>Abe.franklin@state.nm.us |
| Maryann McGraw | SWQB | Wetlands Program Coordinator; Project Oversite; File Manager | Principal Investigator, Assessment Team, assist in site selection, metrics selection, protocol and data management, data transfer and distribution activities.<br>Coordinate technical advisory committee activities and serve as a member, Pilot Study.<br>Maintain Wetlands Program project files.<br>Review of final project report and key deliverables including Field Guide and Manual. Liaison to EPA. | (505) 827-0581<br>maryann.mcgraw@state.nm.us |
| Miguel Montoya | SWQB | QA Officer | Review and approval of QAPP, QA audits, as needed, to assure adherence to the approved QAPP. | (505) 476-3794<br>Miguel.montoya@state.nm.us |

| Name | Organization | Role | Responsibilities | Contact Information |
|---|---|---|---|---|
| Emile Sawyer | SWQB | Data Collection Team | Serve on technical advisory committee, assist with field data collection. | (505) 827-2827 emile.sawyer@state.nm.us |
| Davena Crosley | SWQB | Data Collection Team | Serve on technical advisory committee, assist with field data collection. | (575) 915-1172 davena.crosley@state.nm.us |
| Esteban Muldavin | NHNM | Rapid Assessment Contractor | Assessment Team Leader, assessment design, site selection, protocol and data management, multi-metric analysis, data transfer and distribution activities, contribute to NMRAM Manual, and Field Guide. | (505) 277-3822 ex 228 muldavin@unm.edu |
| Elizabeth Milford | NHNM | Rapid Assessment Contractor | Project Coordinator, Assessment Team, management of NHNM contributing staff compilation of GIS layers for site selection, assist in site selection, protocol and data management, data transfer and distribution activities, Pilot Study details, contribute to NMRAM Manual, Field Guide, image classification, GIS management | (505) 277-3822 ex 227 emilford2@gmail.com |
| Yvonne Chauvin | NHNM Senior Biologist | Rapid Assessment Contractor | NMRAM Data Collection and daily QA Crew Leader. | (505) 277-3822 ex 227 ydchauvin@gmail.com |
| Amy Urbanovsky | NHNM Biologist | Rapid Assessment Contractor | Assist in NMRAM data collection and classification verification and alternate Crew Leader, data transfer | amy.urbanovsky@gmail.com |
| Leslie Rauscher | U.S. EPA | EPA Project Officer | QAPP review and approval | (214) 665-2779 Rauscher.Leslie@epa.gov |
| Nelly Smith | U.S. EPA | EPA Management | QAPP review and approval | (214) 665-7109 Smith.Nelly@epa.gov |

## A4 Project Task Organization

A project organizational chart (Figure A4.1) displays hierarchy of the project.

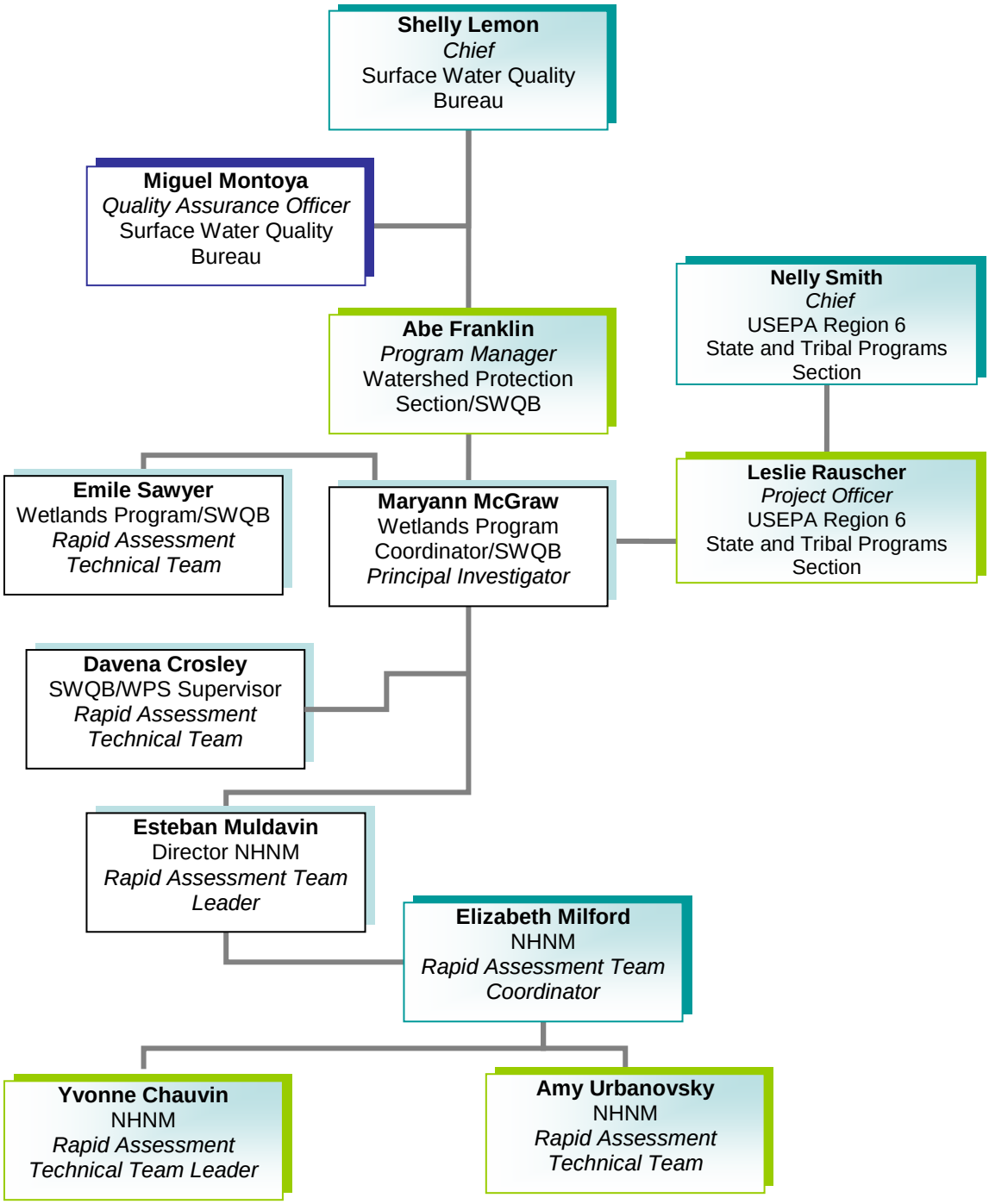


**Figure A 4.1: Organizational Chart of Key Personnel.**

## A5 Problem Definition/Background

This rapid assessment project is designed to develop and test metrics that will assess the ambient condition of a subset of the Riverine Class of wetlands (Brinson et al. 1993) located in canyons or confined valleys in Northern New Mexico. The confined riverine subclass of wetlands is associated with the (B) stream type as described by Rosgen (1996) and modified for this NMRAM. Confined riverine wetlands form the narrow riparian zone along moderately entrenched channels associated with bedrock or bedrock controlled drainageways, and/or faults, folds, and joints typically associated with moderately steep canyons and relatively steep side slopes or canyon walls. Channel slopes range from 2-4% with a characteristic moderate (>12) width to depth ratio. Channel materials are dominated by bedrock or boulders, however, can also include cobbles and sand depending on the surrounding parent materials. The stream banks normally contain finer grained materials than the bed and are typically an unconsolidated mixture with cobble, boulders and wetland plants armoring the banks. Channel sinuosity is between 1.1 and 1.5 and dominated by bed features that produce rapids and pools. The sequence of pool-to-pool spacing is irregular due to the nature of the bedrock or boulder bed. The riverine wetlands associated with this stream type are narrow sometimes widening out slightly as a result of lateral extension processes or entrainment of mass wasted side slope materials and sediment deposition. Wetland plant species are commonly shrubs and herbaceous that can withstand canyon flooding events. Large woody debris and flood deposits are common.

The purpose of defining a subclass is to reduce the natural variability in wetland type as well as variabilities that occur with latitude, altitude, climate and geomorphology. The selection of Sampling Areas (SA) for this project is intended for testing rapid assessment protocols based on channel and floodplain characteristics, confined valley characteristics, floristic characteristics as well as the spectrum of ecological condition, representing the continuum from relatively undisturbed to highly degraded sites. Through the process of field sampling and evaluation of protocols, the NMRAM can be tested and improved before it is more broadly applied.

Riverine wetlands in confined valleys are impacted and threatened by flow regulation by dams, mineral extraction, development and urbanization, agricultural nutrients and livestock grazing, major wildfires, non-native invasive species, and roads. The NMRAM is meant to provide a cost-effective tool to obtain information about the condition of wetlands that may be employed by a variety of users from different agencies and institutions. Additional objectives for NMRAM development include identifying and evaluating 1) abundance, distribution and condition of wetlands in the subclass within the region, including associated habitat, and other functions, above a threshold to maintain ecological services; 2) reference wetland conditions within the subclass; 3) wetland protection needs for the subclass; 4) potential wetland restoration parameters and metrics that may be used to measure wetland restoration effectiveness and recovery; 5) the effects of environmental stressors within the wetlands; and 6) locations to serve as restoration opportunities for the subclass within the region.

The highest priority of the SWQB Wetlands Program is to develop methods for assessment that lead to protection and provide a benchmark for restoration of the State's wetlands resources. Without assessment information, wetlands resources will continue to decline from over-appropriated surface water allocations, development, and other stressors. NMRAM refines reference standard conditions for each subclass, describes the extent and quantity of the targeted wetland type within a reference domain, and identifies the stressors that are causing wetland decline. These data provide justification for preventing or eliminating stressors that will ultimately lead to increases in wetland quality.

The development and use of the NMRAM for confined riverine wetlands, will provide for a robust wetlands assessment program in New Mexico and is consistent with our 2012 New Mexico Assessment and Monitoring Program Strategy for Wetlands. Training agency personnel, watershed group technicians, and other interested parties will accelerate the collection of relevant data and expand the use of NMRAM to other wetlands in the same selected subclasses. The development of a New Mexico wetlands database integrated with other water quality data ensures that these data are available to the state, to communities and EPA and will help provide the basis for wetlands water quality standards. These actions ensure the attainment of quality wetlands and increases in wetlands though improved restoration and protection.

Water resources assessments and management have become priority since the 1948 Federal Water Pollution Control Act and the 1972 amendments contained in the Federal Water Pollution Control Act. Rapid bioassessments (e.g., Barbour et al. 1999) have become standard approaches to evaluate the quality and biotic health of bodies of water and wetlands, and hydrogeomorphic assessments (e.g., Brinson et al. 1995; SSI) have become important tools for determining the hydrologic function of water bodies and wetlands. Wetland rapid assessment methods have evolved to combine aspects of both bioassessments and hydrogeomorphic assessments. Rapid assessment of wetlands assumes that condition can be evaluated based on a set of observable indicators or parameters and metrics, and that ecological condition varies across environmental stress gradients. Rapid assessments are based upon three basic principles: 1) assessments are relative to existing conditions only, 2) the method is rapid such that a team of three trained field technicians can complete the field assessment and data analysis for the assessment in one day, and 3) the assessment is based primarily on observed field conditions (Fennessy et al. 2004). NMRAM is being developed in accordance with these basic principles.

## A6 Project and Task Description

This Project will employ the National Wetlands Inventory and collateral geospatial datasets to identify confined valley locations in northern New Mexico within the Rio Grande and Canadian basins (Figure A6.1). This subset (approximately 100 selected reference sites) will be assigned a preliminary ranking based on best professional judgment and familiarity with the Wetlands of Interest (WOI) by members of the NMRAM Assessment Team.

In addition, NMRAM Assessment Team will review existing rapid assessment metrics and protocols from other rapid assessment methods and select a preliminary set of metrics that will be reviewed and potentially tested for use in the NMRAM for confined riverine wetlands. This information (potential sites and preliminary set of metrics) will be presented to the Technical Advisory Committee (composed of local private, non-governmental organization and agency personnel familiar with riverine wetlands, and the Reference Domain) for their input on the metric selection and preliminary rankings by the NMRAM Assessment Team.

A Pilot Study will be conducted prior to metric selection in which a small set of confined riverine wetlands (5-10) representing the disturbance continuum, unique situations or the potential limits of the Reference Domain will be visited by the NMRAM Assessment Team consisting of NMED Wetlands Program staff, and the NHNM Assessment Team Members. During the Pilot Study preliminary rankings for these sites will be reviewed, the potential utility of possible metrics, and additional metrics that should be included, created, or modified to meet the objectives of the NMRAM for confined riverine wetlands will be discussed. Notes, photographs and conclusions from each site are included in a Pilot Study Report.

From this Pilot Study, a draft set of GIS and field protocols and data sheets will be created for data collection at 30-50 carefully selected sites that represent the disturbance continuum within the Reference Domain. Data collection protocols will include geographic information system (GIS) map evaluations using different land feature and land use map layers (Level 1); and field-based rapid assessment (Level 2) of landscape, abiotic, and biotic attributes using the selected metrics and protocols identified in Section B of this QAPP.

Stressor checklists will be developed or modified from existing NMRAM stressor checklists. These checklists will be used to identify and evaluate the intensity of stressors at each site. Stressors are expected to have a negative effect on the condition of the site, and may provide insight into the ecological integrity of the wetlands. A draft Risk Assessment based from the Stressor Checklist will be developed to more effectively identify the impacts to the resource.

The draft set of NMRAM GIS and field metrics and field sheets will be used for data collection to:

- Verify the suitability of the selected metrics to inform condition of the confined riverine wetlands ecosystem
- Calibrate metric sensitivity relative to the range of variability in condition
- Determine the time and effort it takes to conduct NMRAM assessments
- Determine how stressor type and intensity relates to condition
- Determine the level of experience needed for a team to conduct the NMRAM
- Determine if the outcome provides the information needed to meet the SWQB project goals and NMRAM goals
- Determine site scoring and weighting factors based on condition

The data collection sheets include a Rank Summary Worksheet where the metric ratings are compiled, weighted by importance and sensitivity and summarized for each attribute. Using the attribute scores, the site is given an overall weighted Condition Rank, ranging from excellent to poor.

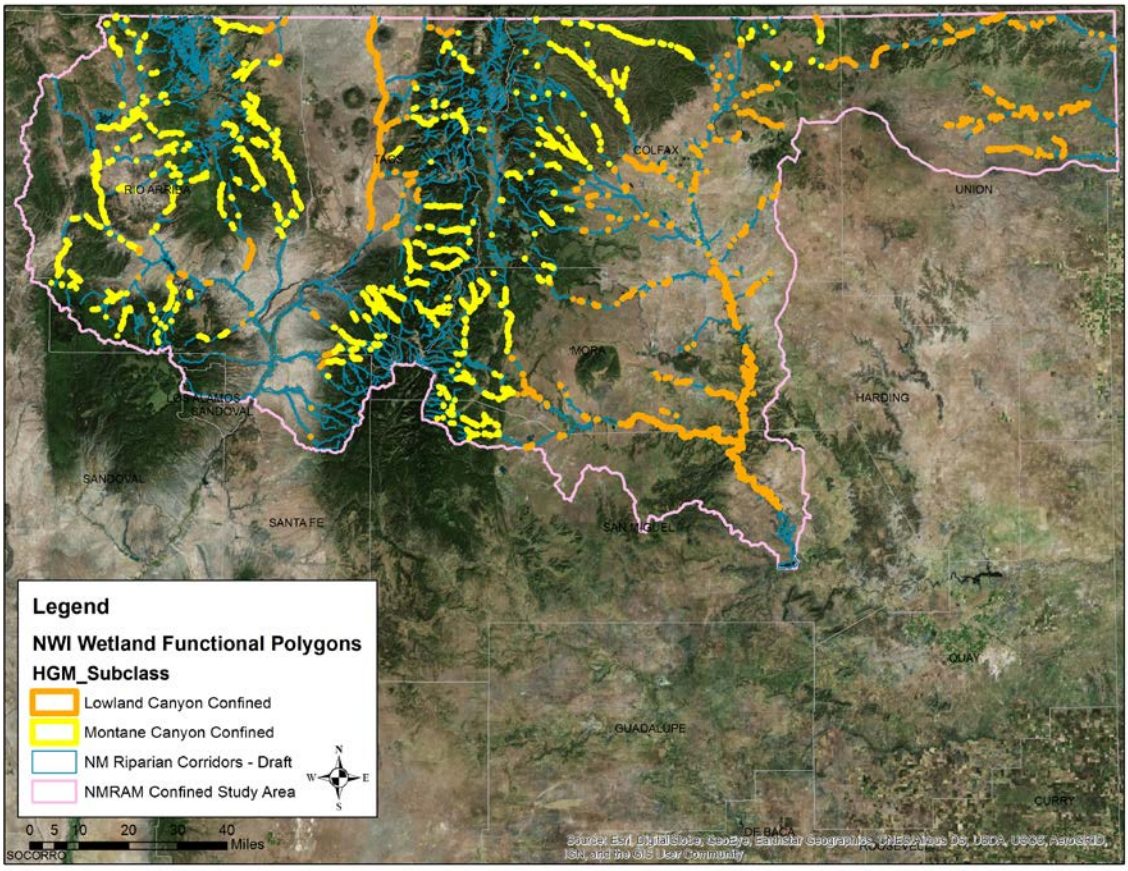


**Figure A6.1: Map of the Reference Domain for developing Rapid Assessment of Wetlands for Confined Valleys.**

NHNM and the WPC will conduct a training day in the field to ensure that all participants in data collection efforts are familiar with the requirements in the QAPP and understand the field protocols for collection of quality data from the selected sites. Safety protocols also will be reviewed on this training day. The Crew Leaders will ensure that all field sheets and data are collected and recorded at the end of each field day and will back up all data sheets either by photographing or copying to a separate hard drive.

Once data collection is concluded, a review meeting will be scheduled for the NMRAM Assessment Team and the Data Collection Team to review the data collection efforts. The data will be entered into NHNM databases for review and multi-metric analyses to ensure the efficacy of all the selected metrics. Draft final Manual Chapter, Field Guide and data collection worksheets will be completed by NHNM and reviewed by SWQB WPC and project staff and prepared for end-user training. The Draft NMRAM Manual for Confined Riverine Wetlands, the Final Field Guide and Final Data Collection worksheets will be the final report of the project by NHNM. With the support and contributions of the WPC,

NHNM will prepare these documents which will be reviewed and accepted by SWQB project staff and WPC.

### *A6.1 Project Schedule and Deliverables*

The project schedule and deliverables are summarized in Table A6.1.1 by task, schedule, description and deliverables, and responsible party. The WPC will track project progress through invoice task completion reports associated with reimbursement requests and through Contractor quarterly progress reports to SWQB. If delays or other issues are recognized by NHNM, the WPC will be notified to develop contingency plans. Project delays will be documented and described in semi-annuals reports filed with the EPA.

**Table A6.1.1: Tasks, Schedule, Deliverables, and Responsible Parties.**

| Task | Schedule | Description and Deliverable(s) | Responsible Parties |
|---|---|---|---|
| **Literature review, geodatabase and map, wetlands classification and subclass description** | Completed March 2018 | **A)** Compile background information on natural environments, land uses, actual/potential human-caused environmental impacts to confined riverine wetlands within the Rio Grande/Canadian Watersheds reference domain. The information search will include interviews with agencies and local active watershed groups. **B)** Analysis layers for the reference domain will be compiled by contractor into a GIS geodatabase including surface hydrology, watersheds, land use, digital elevation model, TMDL stream reaches, and infrastructure such as towns, roads, gas wells, & other available information. **C)** Completed NWI maps, LLWW classification and functional correlation tables for the Rio Grande/Canadian reference domain will be used, and along with the geodatabase will be referenced to refine the wetlands classification for all riverine wetlands within the reference domain (See map). **D)** After the draft classification is constructed, wetland sites that fit the confined riverine subclass and represent the range of condition will be selected, described and given a preliminary rank for rapid assessment development. | McGraw, Milford, and Muldavin |

| Task | Schedule | Description and Deliverable(s) | Responsible Parties |
|---|---|---|---|
| | | Data for each site using standard map and GIS techniques will be analyzed 1) to systematically describe the subclass's typical range of physical characteristics that can be remotely observed, 2) to identify "outlier" sites that may not actually fit within the subclass, and 3) to populate an initial landscape Level 1 database of site characteristics. | |
| **Review Riverine Metrics and Field Guides and Conduct Pilot Study** | A) Completed July 2018<br>B) Completed June 2018 | **A)** In a series of Assessment Team meetings, NMRAM metrics and protocols for confined riverine wetlands will be reviewed to determine if supplemental metrics, stressors and protocols are applicable to the Rio Grande/Canadian confined riverine wetlands. A draft set of metrics will be developed for testing, and will include supplemental and new metrics if necessary, protocols, stressor checklists and rating curves and other information. **B)** A 3-day pilot study will be conducted to review metrics, stressors, determine disturbance at potential data collection sites, view vegetation communities for cover types, answer questions and refine methods before field data collection is conducted. | McGraw, Milford, and Muldavin |

| Task | Schedule | Description and Deliverable(s) | Responsible Parties |
|---|---|---|---|
| **Develop project QAPP** | QAPP approved August 2018 Update Spring 2020. | An QAPP for EPA approval will be developed and updated as necessary. Any changes to procedures during NMRAM will be reflected by changes in the QAPP and submitted to EPA as amendments. The WPC will write and NHNM staff will contribute relevant information to the development of the QAPP. | McGraw, Milford, and Muldavin |
| **Continue Database (SQUID) Development** | Due March 2021 | Draft datasheet PDFs compatible with SQUID will be developed for data collection. After Manual and Field Guide revisions, datasheet PDFs will be finalized, and SQUID will be updated to accept confined riverine data. Work will continue to include webmapping features so users can upload wetlands location polygons and other spatially related features. Requirements and system design of web-features will be constructed and revised to ensure compatibility with NMED information systems and future EPA databases. | McGraw and Milford |
| **Organize Advisory Committee and conduct Advisory Committee Meetings** | 1st Advisory Committee mtg completed August 2018 2nd Advisory Committee mtg Spring or Summer 2020 | Invite Advisory Team members representing Rio Grande/Canadian Watersheds reference domain, invite speakers, conduct 1-day introductory workshop, review metrics, subclass description, stressors and all aspects of NMRAM development to date. Conduct 1-2 follow-up metrics development advisory | Muldavin, Milford and McGraw |

| Task | Schedule | Description and Deliverable(s) | Responsible Parties |
|---|---|---|---|
| | | committee meetings. Distribute notes and draft metrics for participant review and comment. | |
| **Prepare data collection materials and supplies, schedule entry, conduct rapid assessment field training** | Due August 2018, July 2019, and again in July 2020 | Contractor will obtain sampling supplies, assemble data collection team and prepare for fieldwork. Field packets will be prepared for each site including SQUID-compatible field sheets, maps and directions to properties. Landowner information will be kept on file for future data collection and participation time will be tracked as project match. The Contractor and WPC will conduct 2-day field training for field data collection team and others listed in the QAPP to ensure that all protocols are clearly understood and are consistent with the QAPP. | Milford, Urbanovsky, Chauvin, Muldavin, and McGraw |
| **Collect data from 40 wetland sites, Database Entry** | September 2018, Summer 2019, and Summer 2020 | Data Collection Team will collect condition/function-related and stressor data and include floristic quality and selected Rosgen Level 2 geomorphology data from 20 Rio Grande/Canadian confined riverine wetland sites in 2018 and 20 Rio Grande/Canadian confined riverine wetland sites in 2019. NMRAM data will be reviewed for quality assurance and then entered into SQUID. Floristic Quality data | Sawyer, Chauvin, Urbanovsky, Crosley |

| Task | Schedule | Description and Deliverable(s) | Responsible Parties |
|---|---|---|---|
| | | and Rosgen Level 2 data (Rosgen 1996) will be entered into UNM Heritage databases for analysis/ validation of metrics. | |
| **Multi-metric Analysis. Recalibration and Validation, Complete Manual and Field Guide** | Ongoing through January 2021 | **A)** NMRAM data will be analyzed and incorporated into rating curves for selected indices and sites scored. Indices and condition score will be recalibrated and validated to correlate landscape, abiotic, and biotic (attributes) and compare condition of sampling sites with levels of stress affecting the site. Results will be reviewed in a series of Assessment Team meetings and with the Advisory Team. **B)** Revise assessment protocol and incorporate modifications, including refinement of functional/condition indices, inclusion of any supplemental indicators, and modifications to condition scoring into Manual and Confined Riverine Field Guide. Revise and refine definition of subclass based on data collection and revise datasheets as necessary. Review and update Stressor Checklists and develop a Risk Assessment based on the stressors that are affecting the site. | Muldavin, Milford, Urbanovsky, Chauvin, Crosley, Sawyer, McGraw |

| Task | Schedule | Description and Deliverable(s) | Responsible Parties |
|---|---|---|---|
| **Organize Assessment Protocol Short Course** | August-September 2020 | Present Manual and Confined Riverine Field Guide to agency, watershed group and contractor personnel in a three-day short course/field training for end-user's including data entry. | Muldavin, Milford, McGraw |
| **Quarterly, Semi-Annual and final reports** | Quarterly and Semi-Annually, April 2021 | Quarterly reports of project progress from Contractor, Final Field Guide, Manual and fillable PDF data collection worksheets. Semi-Annual Reports to EPA and Final Report. | McGraw, Muldavin and Milford |

## A7 Quality Objectives and Criteria for Measurement Data

This section describes the data quality objectives of the project, identifies the targeted action limits and levels, and defines the measurement performance or acceptance criteria deemed necessary to meet those objectives.

The purpose of this project is to expand the knowledge of the condition of wetlands in confined river valleys in New Mexico. Data quality will be measured against the quantitative and qualitative data quality indicators described below and in accordance with Section 1.5 of the SWQB QAPP (SWQB, 2016)

**Table A7.1: Data Quality Indicators**

| Data Quality Indicator | Data Acquisition |
|---|---|
| Precision | Precision will be ensured by consistently assigning the same staff the responsibilities of collecting, recording and analyzing data. |
| Accuracy | Accuracy based on the use of methods determined to be reliable, and tested through the pilot and subsequent field inventory components |
| Bias | Bias will be reduced by using professional and experienced staff to collect and analyze data |
| Representativeness | Sample site selection is representative of the varied continuum of reference conditions needed to develop the methodology. |
| Comparability | Methods for data collection are standardized and reproducible from the development and adherence to this QAPP. |
| Completeness | All known sites within the subclass were selected to assess the range of conditions. All identified metrics will be collected for each of the sample areas to ensure completeness. |
| Sensitivity | Sensitivity of the metrics used will be analyzed during the analysis and recalibrated as applicable to develop the methodology. |

## A8 Special Training Requirements/Certification

SWQB has qualified and experienced scientific staff, with expertise in GIS, wetland identification, Rosgen classification, the development of rapid assessment methods, and southwestern riparian ecosystems to help carry out and administer this project. In addition, the Wetlands Program is using qualified contractors with extensive experience in New Mexico's wetlands and in the development of rapid assessments, biotic integrity, riparian vegetation and hydrogeology, and field work to carry out this EPA-funded Rapid Assessment of Wetlands (Natural Heritage New Mexico), which will include a validation of spatial attributes applied to the assessment sites. The Assessment Team and Technical Advisory Committee for Rapid Assessment will be given a copy of this QAPP and will be instructed in appropriate validation and ground truth techniques.

**Maryann McGraw** (WPC), received her Bachelor's and Master's Degrees in Geology from University of Texas at Austin, and is an Environmental Scientist/Specialist Supervisor for SWQB. Maryann has been the principal investigator and contributing

author for all NMRAMs to date. She has attended advanced training sessions in fluvial geomorphology assessment of stream conditions and departures conducted by Dave Rosgen, California Rapid Assessment Method (CRAM), HGM training, NWCA training and Stream Pyramid Training. The WPC has also conducted monitoring of riparian areas and assisted monitoring protocols for other wetlands projects during the last 10 years. She worked for NRCS Los Lunas Plant Materials Center propagating wetland plants. She has also participated in the development of the Rio Puerco Monitoring Manual and is qualified for developing assessment criteria, conducting and participating in the training, and for overseeing and managing any of the monitoring procedures specified for this project.

**Emile Sawyer** serves as data collection technician for this project. He is an Environmental Scientist-Specialist and Wetlands Program team member for the SWQB, based in the Santa Fe Office. Prior to attending New Mexico Highlands University, where he earned his Environmental Science - Geology degree in 2003, Mr. Sawyer worked from 1992 to 2003 as a contract forestry technician throughout the Rocky Mountains. He earned his MS in Hydrogeology from the University of Nevada - Reno in 2009. Mr. Sawyer's graduate research at the Desert Research Institute in Reno, Nevada was based on using stable isotopes to track groundwater flow and evaluate a water balance model in the Colorado Flow System of eastern Nevada.

**Davena Crosley** serves as data collection technician for this project. She is an Environmental Scientist-Specialist Supervisor for the SWQB Watershed Protection Section, based in the Las Cruces Field Office. Ms. Crosley earned her Secondary Education and Science Education B.S. degree with an emphasis in Biology from Western New Mexico University in 1999, then went on to earn a MA in Science Teaching with an emphasis in Geology from Northern Arizona University in 2007, and an Interdisciplinary MA in Biology and Business from Western New Mexico University in 2011. Ms. Crosley researched vegetation recovery in post-fire treatment areas and utilization of these areas by avian species after the Whitewater-Baldy fire in the Gila National Forest in 2013. She also worked for the Mining Act Reclamation Program as a Reclamation Biologist reviewing, approving and ensuring suitable implementation of post-mining reclamation plans for hard rock mines in New Mexico.

**Contractor** qualifications are documented through resumes and professional references. The qualifications have been reviewed by the SWQB WPC for this project. The documentation of this information will be kept in the SWQB project files managed by the File Manager. NHNM staff resumes were submitted with the project proposal to EPA, and are available from the project File Manager.

### A9 Documentation and Records

Copies of this QAPP and any subsequent revisions will be provided to all individuals included on the distribution list by the SWQB Wetlands Program Coordinator. Signed Acknowledgement Statements will be kept in the project file by the File Manager.

The WPC will also distribute all applicable protocol documents and subsequent revisions used throughout the project to the appropriate contractors. NHNM will prepare and submit quarterly project reports. These will be submitted to NMED, in accordance with the approved QAPP. The QAPP, protocol documents and reports will be maintained on the SWQB Wetland Program Coordinator's hard drive, SWQB server (File Depot) and in the project file at SWQB Santa Fe, at NHNM, and at the EPA Region 6 Wetlands Program.

This QAPP includes references to protocols for the development and testing of written procedures for all methods, metrics and procedures or protocols related to the collection, processing, analyses, reporting and tracking of environmental data. All data generated from this project and covered by this QAPP will be of sufficient quality to withstand challenges to their validity, accuracy and legibility. To meet this objective, data are recorded in standardized formats and in accordance with prescribed procedures.

The documentation of all environmental data collection activities will meet the following minimum requirements:

1. Data, data collection and analytical methods, and associated information must be documented directly, promptly, and legibly.
2. All reported data must be uniquely traceable to the raw data. All data reduction/transformation formulae must be documented.
3. All original data records include, as appropriate, a description of the data collected, units of measurement, unique sample identification (Request Identification [RID] number), station or location identification (if applicable), name and signature or initials of the person collecting the data, and date of collection.

Any changes to the original (raw data) entry must be clear and not obscure the original entry. Taxonomic refinements and translational typographic errors will be corrected on the field datasheets and in the database, with clear documentation of what and by whom those changes were made.

### *A9.1 Reporting Format and Storage*

All field data will be recorded each day and for each metric on project-specific field data sheets. The field crew will scan a representative sample and email them to the SWQB WPC. After the field work, the NHNM Project Coordinator will assign NHNM personnel to enter the data into the NHNM database. Typically, this task is assigned to several personnel to reduce fatigue. Assigned staff may include the NHNM Project Coordinator, Data Technicians, interns, or contractors (e.g. botanist). The personnel entering data from a datasheet will sign and date each sheet when it is complete. The NHNM database requires a username, password, and specific permissions to access and edit data, and tracks the username and date when records are added or edited. Once the data have been entered and corrected, the Project Manager will assign NHNM staff to scan the field data sheets if not already electronically generated; these will be delivered to the SWQB WPC. The Surface Water Quality Information Database (SQUID) is the central repository for NMRAM data at SWQB. NHNM will deliver the data into a geodatabase that includes all related tables and metadata to the NMED for inclusion in SWQB project files until

SQUID is prepared for Confined NMRAM data entry. The SWQB WPC will ensure this data has been entered into SQUID by December 2019. Copies of the paper datasheets will be kept in the project file at SWQB and at NHNM office. A list of sites visited and site scores will be provided by the WPC to EPA Region 6 Wetlands Program as a deliverable attachment to the semi-annual reports. The data collection report produced by the Contractors and SWQB will include scans of the data collection worksheets in an appendix.

## B DATA GENERATION AND ACQUISITION

### B1 Sampling Design

The selection of the confined riverine wetland subclass was based on SWQB prioritization of wetland types. The details regarding this prioritization are:

1. absence of data or assessment methods for confined riverine wetlands and
2. continuum of disturbance

The Upper Rio Grande and Canadian Watersheds were chosen as the Reference Domain based on:

1. existence of potential best available reference sites
2. access
3. relation to existing SWQB water chemistry data collection sites
4. potential for impairment by future stressors (anthropogenic activities)

All potential riverine wetland areas representative of the confined riverine subclass will be initially identified within the Reference Domain (See Figure A6.1). The individual sites representing the confined riverine wetland subclass will be selected by visually inspecting National Wetlands Inventory (NWI) map layers and other GIS-based collateral data layers by NHNM. Riverine waters will be identified using SWQB 305(b) waters GIS layers over a background of digital orthophoto quarter quad (DOQQ) layers for the target Reference Domain. The GIS layers are organized into ArcGIS 10.2 databases and each floodplain system is reviewed for confined floodplain segments. Polygons will be drawn over each confined floodplain segment.

The polygons will be reviewed for consistency and then broadly ranked by degree of disturbance. The reference set will be narrowed down to (50) that fit within the wetland subclasses in the reference domain. The August-September 2018 field data acquisition will be narrowed down to 20 selected sites for the NMRAM confined riverine wetlands subclass in the Upper Rio Grande. The sites will be selected based on available access and representation of the range of disturbance.

Draft metrics will be selected by the Assessment Team for testing. Draft metrics will represent relevant attribute categories such as Landscape Context, Size, Biotic, and Abiotic (Table B1.1). The metrics are measured using maps and aerial imagery or evaluated in the field. Landscape Context and Size metrics are assessed using maps

and/or a geographic information system (GIS) and these are termed “Level 1” metrics (Fennesey et al 2004). Landscape Context metrics usually are evaluating conditions surrounding the SA (the Buffer, Riparian Corridor, or Land Use Zone) and are preferably completed before going into the field to help familiarize the team with the site. Size metrics are also measured using maps. Level 1 metrics are also confirmed or modified as necessary during the field survey.

**Table B1.1. Major categories of indicators, sample indicators and assessment level of effort used in wetland rapid assessment methods.**

| ATTRIBUTE | INDICATOR | LEVEL |
|---|---|---|
| **Hydrology (Abiotic)** | Hydrologic Alterations | 2 |
| | Hydroperiod | 1 |
| | Surface Water Connectivity | 2 |
| | Flood Storage Potential | 2 |
| | Water Sources | 1 and 2 |
| | Maximum water depth | 2 |
| **Soils/Substrate (Abiotic)** | Substrate Disturbance | 2 |
| | Microtopography | 2 |
| | Sediment Composition | 2 |
| **Vegetation (Biotic)** | Degree of Interspersion | 1 |
| | Extent of Invasive Species | 2 |
| | Endangered/threatened species | 1 and 2 |
| | Presence and cover of wetland plant species | 2 |
| | Vegetation Vertical Structure | 2 |
| | Course Woody Debris | 2 |
| | Dominant Vegetation | 2 |
| | Native Riparian Tree Regeneration | 2 |
| | Relative Native Plant Community Composition | 2 |
| **Landscape Context and Size** | Size | 1 |
| | Relative Wetland Size | 1 |
| | Surrounding Land Use | 1 |

| | | |
|---|---|---|
| | Riparian Corridor Connectivity | 1 |
| | Extent and Condition of Buffer Zone | 1 |
| | Wetland Configuration | 1 |

In contrast, Biotic and Abiotic metrics are determined and evaluated in the field. rapid field-based metrics are termed "Level 2" metrics. Biotic metrics may be based on floristic or wildlife data that represent habitat condition. Abiotic metrics may be based on hydrology, geomorphology, physical features, or soil conditions. Level 2 metrics are sensitive to disturbance and can be collected by using data collection methods or observations with direct results in the field or by matching features within the sample area with narrative descriptions identified in past NMRAM's. Rapid assessments do not use methods that require lab analyses or other intensive methods which would be considered Level 3. In addition, a draft set of field-based stressor checklists grouped by attribute class are completed during the field survey along with annotated field maps and documentary photographs. During the initial data collection, the Field Teams take additional notes and photographs to provide feedback to the Assessment Team as to how the draft metrics are applied, details for describing the application of the metrics, stressors that are evident, and other comments that will help in the development of a suite of metrics that evaluate wetland condition.

After data from the 2018 data collection effort is analyzed and refined for further testing, a second 10 sites in the Canadian Watershed will be selected for 2019 field season data collection and 30 sites in the Canadian and Rio Grande Basins for the 2020 field season to further test and refine metrics.

The NMRAM Field Guide for Confined Riverine Wetlands will provide procedures for conducting a rapid ecological assessment of wetlands in confined valleys. It will provide specific protocols and datasheets for evaluating wetland ecological condition using a combination of GIS-based measurements and field surveys. In addition to details on metric measurements, appendices are provided that include at minimum, the data collection worksheets, a plant species list with wetland indicator status, an invasive plant species list and a glossary of terms.

The metrics either designed or selected from existing references, are grouped into four attribute categories: Landscape Context, Size, Biotic, and Abiotic. Landscape Context and Size will be measured using maps and aerial imagery in a GIS framework, and these are termed "Level 1" metrics. Level 1 metrics generally assesses the Sample Area (SA) and then an area surrounding the SA defined as either a buffer or Land Use Index Boundary. The other remaining attribute categories (Biotic, and Abiotic) are evaluated in the field; these are termed "Level 2" metrics. Level 1 metrics are confirmed or modified as necessary during the field survey.

In addition, identified stressors will be evaluated and documented on the stressor checklist during the field survey. Maps will be annotated with data collection site details, changes to landscape and size metrics and other features of note in the SA and the surrounding buffer. Documentary photographs allow the Field Team to relate findings back to the Assessment Team as well as supporting choices and data collected in the field. Documentary photographs are also taken of plant species that need further identification and as supporting documentation for plant communities identified in the SA. Photographs are used as supporting data collection and are generally not considered a metric or used as data by themselves.

Metric scores based on Level I analysis and field data (Level 2) are weighted by importance and rolled up into an attribute score (i.e., Size, Landscape Context, Biotic and Abiotic Scores) where A = Excellent (≥3.25-4.0); B = Good (≥2.5-<3.25); C = Fair (≥1.75-<2.5), and D = Poor (1.0 -<1.75). The rationale behind scoring procedures and the efficacy of any given metric will be provided in the NMRAM Manual.

A set of worksheets organized by attribute classes will be developed to support efficient data capture**.** These data collection worksheets will be provided as printable forms in Appendix A of the Field Guide and as a downloadable fillable PDF file that computes and rates most metrics automatically and rolls up the scores for the user. The worksheet packet contains a cover worksheet for recording basic information, surveyor identification, and narrative descriptions of the SA by attribute. The worksheets together with maps and photographs make up the NMRAM Assessment Package that becomes the supporting record at a project level and the tool for data entry into SQUID. A Team Leader will check field sheets for accuracy and completeness prior to leaving the SA. A representative set of field sheets will be scanned and sent to the WPC and/or NHNM Program Manager for further inspection and review.

## B2 Sampling Methods

The draft metrics will be designed to measure aspects of condition that are relative to the reference conditions based on the literature cited in the reference section of this QAPP and on best professional judgment. Potential metrics are not limited to those in the literature but are provided as an example of the types of data to be assessed.

### *B2.1 Surface Water Sampling at Confined Riverine Wetland sites*

No water samples will be taken for the NMRAM for confined riverine wetlands.

### *B2.2 Field Health and Safety Procedures*

The NHNM/SWQB data collection team will conduct field trips to complete assessment work. These will be scheduled during late summer during the index period for most plants that might be encountered in the field. Field data collection will be scheduled to avoid thunderstorm activity and flooding in confined valleys, and in warmer weather while plants are more likely to be in bloom for purposes of identification.

Safety is of primary importance to field studies. Only sites that are safely accessible will be sampled. Unsafe sites include, but are not limited to, private lands not granting permission access, areas with evidence of illegal activities, exceptionally steep-sided and unstable canyon slopes adjacent to canyon streams, swift water in flooding canyons.

In remote areas, the data collection team will always carry sufficient supplies of water, food, flashlights, shovels, extra spare tires, and first aid and emergency supplies to deal with accidents and unexpected circumstances, such as rapid changes in weather. Hard hats and closed-toe boots are required in burned or construction areas. Teams should have adequate communication devices for their location (cell phones, gps, etc.). A field team will consist of at minimum a botanist, a hydrogeologist, and technical assistants. A designated crew leader will be determined by NHNM Project Coordinator and WPC during the Field Team training before data collection field trips, and will be responsible for field trip decisions, crew performance, and data compilation. At least one team member will have swift water training.

Any invasive species will be identified during data collection at the 50 wetland sites. Measures will be taken to prevent the carrying of seeds and propagules from site to site including the visual inspection and sterilization of shoes, clothes and equipment. Measures and procedures for invasive species control will also be included in the NMRAM Field Guide for Confined Riverine Wetlands.

### *B2.3 Field Variances*

As field conditions vary there may be the need for safety, common sense, or local site variables that prohibit or require minor adjustments to the sampling procedures and protocols. Such changes will be reported to the crew leader and that information passed on to the QAO. If there is a deviation from the QAPP, the project manager/project coordinator must notify the QAO and provide written notification of the proposed changes and explanation on the reasoning behind the change. Upon the QAO's approval, modification to the QAPP will be sent to the EPA for review and approval. Sampling problems, minor adjustments of field sampling, and QAPP modifications will be documented in any quarterly or annual reports to US EPA.

### *B2.4 Decontamination Procedures*

Field equipment and shoes will be decontaminated between sites using a dilute bleach solution. This decontamination procedure is needed to prevent the spread of aquatic and terrestrial invasive species. Field clothing, including boots, will be decontaminated using a dilute bleach solution either in the field or by frequent laundry machine application. Disposal of decontamination fluids and rinse fluids is described below under "Disposal of Residual Materials". Any gloves used during the sampling regime will be considered disposable and will be packaged for disposal appropriately between sites.

### *B2.5 Disposal of Residual Materials*

In the process of sampling there may be a small amount of waste, including used personal protective equipment (PPE). The USEPA's National Contingency Plan requires that management of the wastes generated during sampling comply with all applicable or relevant and appropriate requirements to the extent practicable. Residuals generated for

this project will be handled in a manner consistent with the Office of Emergency and Remedial Response (OERR) Directive 9345.3-02 (May 1991), which provides the guidance for the management of wastes. In addition, other legal and practical considerations that may affect the handling of the wastes will be considered, as follows:

Used PPE and disposable containers or equipment will be bagged and placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any used PPE and disposable containers or equipment (even if it appears to be reusable) will be rendered inoperable before disposal in the refuse dumpster.

Decontamination fluids generated in the sampling event could consist of water and bleach. Decontamination fluids will be disposed into a municipal sewerage or onto an impervious surface for evaporation, at least 50 m from the nearest surface water.

### B3 Sample Handling and Custody

No samples are expected to be collected for analysis at a laboratory for this project.

### B4 Field Measurement Methods

Relevant metrics using Rosgen Level 2 geomorphology surveys techniques, such as cross-sections and longitudinal profiles, will be conducted at the 50 selected wetland sites throughout the Reference Domain as needed. Methodology will follow that developed by Rosgen (1996) Applied River Morphology. Surveys will be GPS for future data collections efforts to ensure repeat surveys data collection are recreated accurately.

Plant communities will be documented using photographs throughout the SA. Photograph site locations will be recorded using a GPS to ensure accurate creation of the plant community map. Photo documentation will occur during September 2018, Summer 2019, and Summer 2020 data collection. Other documentary photographs include cross section locations upstream, downstream and from bank to bank. Photograph documentation details will be recorded on the data collection worksheets on designated photo-documentation pages.

### B5 Quality Control

Quality control (QC) activities are technical activities performed on a routine basis to quantify the variability that is inherent to any environmental data measurement activity. The purpose for conducting QC is to understand and incorporate the effects the variability may have in the decision-making process. Additionally, the results obtained from the QC analysis, or data quality assessment, may identify areas where variability can be reduced or eliminated in future data collection efforts, thereby improving the overall quality of the project being implemented. Many of the proposed metrics consist of observation data including plant species lists and site geomorphology. To ensure quality control for these observational data, the data collection team will have subject

matter experts. For example, the team will include a trained or degreed botanist, a hydrogeologist to eliminate errors.

### *B5.1 Field Sampling Quality Control*

All Data Collection Team members who collect environmental data must be trained in the use of the metric protocols and will collect data in accordance with the procedures as they are defined in the draft NMRAM Field Sheets and at the training session.

Several potential metrics lend themselves to observer bias, particularly estimation and measurement of vegetation cover and land use cover. Density estimation sheets are useful for training and calibration of field team members and will be part of the NMRAM Field Guide if other sources are not available. Results of all Data Collection Team training prior to field data collection and calibration efforts will be documented and provided by NHNM in quarterly reports to SWQB.

### *B5.2 Data Entry Quality Control*

Field sheets will be organized, reviewed for completeness and placed in a labeled file folder by the team leader. The fillable PDF data collection worksheets flags entries or values that are not consistent with that expected for the metric. NHNM trained support staff will enter the data into NHNM database other than the individual who filled out the field sheet. Should any questions arise, the data entry personnel will add a note to the field sheet and contact the field team member to answer that question. When each data point from a page has been addressed, the data entry staff person will sign and date the field sheet. The NHNM Program Manager and the WPC will review all data, using standardized exported reports that identify missing values and outliers.

## B6 Instrument/Equipment Testing, Inspection, and Maintenance

The NHNM Team Coordinator is responsible for inspecting equipment and supplies before leaving for field data collection field trips and upon return to NHNM office.

## B7 Instrument/Equipment Calibration and Frequency

Rosgen Level 2 measurements will be limited to those that can be collected using a tape measure and level. There are no instruments/equipment that require calibration.

## B8 Inspection and Acceptance of Supplies and Consumables

### *B8.1 Field Sampling Supplies and Consumables*

The NHNM Team Coordinator is responsible for preparing equipment and supplies checklists and informing the Data Collection Team leader of needed supplies and equipment for each field sampling trip. Contractor field sampling supplies and consumables are checked at the end of every field trip by the Data Collection Team Leaders. Replacement supplies and consumables are purchased as needed and checked before the next field trip. All team members are expected to be familiar with the equipment and supplies needed for an individual trip. A copy of the checklist is reviewed and completed during trip planning.

### B9 Non-Direct Measurements

Printed field maps for each data collection site are an integral part of the NMRAM Assessment Package. Printed field maps will be prepared for each data collection site by the NHNM Team Coordinator. Two different map formats are required to support field mapping and the field survey; 1) A map at approximately 1:6000-10000 scale that shows the SAs in a landscape context. This map should delineate the maximum extent of a potential buffer and land use index area. 2) a map that encompasses a single SA at between 1:1500-3000 scale for mapping vegetation communities, abiotic features and transect locations. Two copies of the field maps are required, one for measuring biotic metrics and one for measuring abiotic metrics. Modifications to the SA boundary will be recorded on the SA abiotic map.

### B10 Data Management

Data obtained for this project are maintained in a relational database and GIS electronic files at NHNM and SWQB. All electronic data will be filed and labeled in a consistent manner. All data will be delivered to the WPC as soon as practical following data collection event. All data are secured through password protection and are unavailable to unauthorized users, to protect from accidental manipulation. Exported geodatabases that are delivered to the SWQB contain metadata that includes the date of export. Data transmitted to the SWQB and advisory committee are available at NHNM, on the SWQB hard drive, SWQB server (File Depot) and in hard copy form as Wetlands Program files that are maintained by the SWQB File Manager.

Contractors will provide summary reports to the SWQB WPC. All data and summary reports will be compiled into the semi-annual and final project report and provided to US EPA Region 6 Wetlands Program.

#### *B10.1 Data Acquisition, Direct Measurements*

Expeditious data entry helps ensure field team memory of site-specific details, and ability to respond to questions by the project and program managers or the Principal about questionable data.

NHNM follows three data acquisition principles:

1. It should be highly efficient, requiring no more time to enter the data than it did to collect them.
2. The data entered should be restricted to assure accuracy and consistency, with terminology, scientific names, and responses limited to values in lookup tables, yet have the flexibility to allow for anomalous occurrences.
3. Users must be able to easily export meaningful data.

## C ASSESSMENT AND OVERSIGHT

### C1 Assessment/Oversight and Response Actions

The SWQB WPC provides project oversight by reviewing data collection efforts. The NHNM Data Collection Team leader provides day-to-day oversight during data collection activities including adherence to this QAPP. Any problems encountered during the course of this project will be immediately reported to the SWQB WPC, who

will consult with appropriate individuals to determine appropriate action. Should the corrective action impact the project or data quality, the SWQB WPC will alert the Quality AO. If it is discovered that RAM methodologies must deviate from the approved QAPP, a revised QAPP must be approved before work can be continued. All problems will be documented for inclusion in the project file, semi-annual and final reports. The SWQB will assess project progress to ensure the QAPP is being implemented, including periodic audits by the QAO, as needed. Those assessments and any problems will be reported by the SWQB WPC to the QAO.

### C2 Reports to Management

Quarterly reports will be prepared and reviewed internally by the Contractor, and presented to the SWQB WPC and staff their review. Any deviations from the specifications in the SWQB Project Workplan and NHNM Intergovernmental Agreement for this project will be documented and reported to WPC. Following inclusion of SWQB review comments, the Contractor will submit finalized reports to the SWQB WPC, who will present those reports to the US EPA Grants Project Officer, to show project accomplishments, data acquisition and entry, and to provide a venue to bring up any issues with the project. The reports will allow the EPA to assess the productivity of the NMRAM for riverine wetlands within confined valleys and be kept informed on the progress of the project. A report detailing the findings will be provided in the final project report to EPA by SWQB. The field guide and manual will serve as major documentation of the NMRAM for riverine wetlands within confined valleys, and will relate the findings to several different NMRAMs, covering different wetlands types in New Mexico.

## D Data Review and Usability

### D1 Data Review, Verification, and Validation Requirements

Prior to using the data for wetlands protection, policy, or public uses, the quality of the data will be reviewed and evaluated, as described in Sections B10.1 and C1, above. Data are compiled from field sheets, reviewed and verified by NHNM staff that did not enter those data, and re-verified and validated by NHNM Project Coordinator. Errors will be corrected where possible and rejected and reported upon by the NHNM if questions about those data cannot be satisfactorily answered. Additional review, verification, and validation will be completed by SWQB WPC. Standardized and randomized checks of data entry, field calibration of instrumentation, and technician training will be conducted and reported upon by the NHNM, and data error levels above 1% will not be accepted. These data review, verification, and validation efforts will ensure NHNM provides high quality assessment data to SWQB.

### D2 Verification and Validation Methods

Defining the data verification and validation methods helps ensure that project data are evaluated in an objective and consistent manner. For the current project, such methods have been described in Section D1 (above) for information gathered and documented as part of the field measurement activities.

### D3 Reconciliation with User Requirements

NHNM, in collaboration with the SWQB and the Technical Advisory Committee, will use the assembled pilot study data to clarify issues related to protocol adequacy, completeness, and efficiency. The data assembled through the larger inventory and assessment will be used to further those analyses, and to address the question of the applicability of the methods to demonstrate the utility of the NMRAM for confined riverine wetlands in New Mexico. Critical analyses here will include the adequacy of the methods for identifying individual sites that are exemplary and of use as reference sites, sites at which management attention is warranted, and site at high levels of risk due to anthropogenic impacts. Such analyses will be conducted using ranked, non-parametric statistical analyses, and multivariate analyses of the diverse physical, and biological ranking. These analyses will help clarify the utility of the project to meet the management and policy needs of the State of New Mexico.

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**Appendix 1: Acknowledgement Statement**

**New Mexico Environment Department Surface Water Quality**

# Rapid Assessment of Wetlands within Confined Valleys, and USACE NMRAM Phase 2, New Mexico

Quality Assurance Project Plan Acknowledgement Statement (QAPP)

This is to acknowledge that I have received a copy of the QAPP for Rapid Assessment of Wetlands within Confined Valleys, and USACE NMRAM Phase 2, New Mexico.

As indicated by my signature below, I understand and acknowledge that it is my responsibility to **read, understand, become familiar with and comply** with the information provided in the document to the best of my ability.

_____
Signature

_____
Name (Please Print)

_____
Date

***Return to SWQB Wetlands Program Coordinator (Maryann McGraw)***